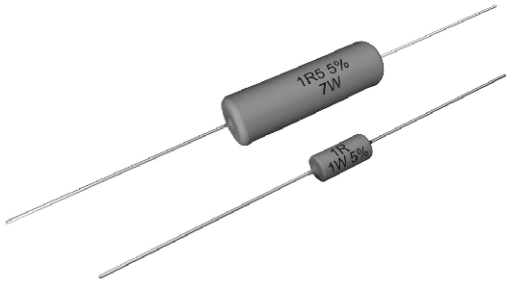
Cemented Wirewound Resistors



FEATURES

- All welded construction
- Ceramic core
- Non-flammable cement coating
- Tinned copper-clad iron leads (for axial parts)
- High power dissipation in small volume
- Ideal for pulse application
- Lead (Pb)-free
- Compliant to RoHS directive 2002/95/EC

Pb-free
RoHS COMPLIANT
GREEN (5-2008)**

STANDARD ELECTRICAL SPECIFICATIONS

MODEL	POWER RATING		LIMITING VOLTAGE	RESISTANCE RANGE (2)			TOLERANCE
	$P_{40\,°C}$	$P_{70\,°C}$	$U_{max.}$	TCR = - 10 ... - 80 ppm/K	TCR = 100 ... 180 ppm/K	TCR = ± 100 ppm/K	
AC01	1 W	0.9 W	$\sqrt{P \times R}$	0.10 Ω to 33 Ω	36 Ω to 2.4 kΩ	-	± 5 %
AC03 (1)	3 W	2.5 W	$\sqrt{P \times R}$	0.10 Ω to 390 Ω	430 Ω to 3.3 kΩ	3.6 kΩ - 5.1 kΩ	± 5 %
AC04	4 W	3.5 W	$\sqrt{P \times R}$	0.10 Ω to 620 Ω	680 Ω to 6.8 kΩ	-	± 5 %
AC05	5 W	4.7 W	$\sqrt{P \times R}$	0.10 Ω to 910 Ω	1 kΩ to 10 kΩ	-	± 5 %
AC07	7 W	5.8 W	$\sqrt{P \times R}$	0.10 Ω to 1.5 kΩ	1.6 kΩ to 15 kΩ	-	± 5 %
AC10	10 W	8.4 W	$\sqrt{P \times R}$	0.22 Ω to 560 Ω	620 Ω to 27 kΩ	-	± 5 %

Note

(1) AC03 WSZ: $P_{40\,°C}$ = 1.8 W; $P_{70\,°C}$ = 1.5 W

PART NUMBER AND PRODUCT DESCRIPTION

Part Number: AC03000001509JAC00

A	C	0	3	0	0	0	0	0	1	5	0	9	J	A	C	0	0

MODEL	VARIANT	TCR/MATERIAL	VALUE	TOLERANCE CODE	PACKAGING CODE	SPECIAL
AC01000 = AC01 **AC03000** = AC03 **AC04000** = AC04 **AC05000** = AC05 **AC07000** = AC07 **AC10000** = AC10	**0** = Neutral **1** = RT **2** = SWI = Special winding (3) **3** = DK SP 20 mm (4) **4** = DK LP 33 mm (4) **5** = DK LP 17.8 mm (4) **6** = NI = Non inductive **7** = DK LP 25.4 mm (4) **9** = WSZ 6720 **8** = DK SP 25.4 mm **Z** = Value overflow (Special) **C** = E/K 25.4 mm (4)	**0** = Standard	**3 digit value** **1 digit multiplier** MULTIPLIER **7** = $*10^{-3}$ **8** = $*10^{-2}$ **9** = $*10^{-1}$ **0** = $*10^{0}$ **1** = $*10^{1}$ **2** = $*10^{2}$ **5** = 10^{-4}	**J** = ± 5.0 %	(See Packaging table)	The 5 digit BV number will be encoded using a 36 character code. This code contains numbers 0...9 and letters A...Z (36 characters total) and allows to encode at least 46 655 five digit BV numbers. **00** = Standard

Product Description: AC03 15R 5 % AC

AC03	15R	5 %	AC
MODEL (5)	VALUE (5)	TOLERANCE CODE (5)	PACKAGING DESCRIPTION (6)

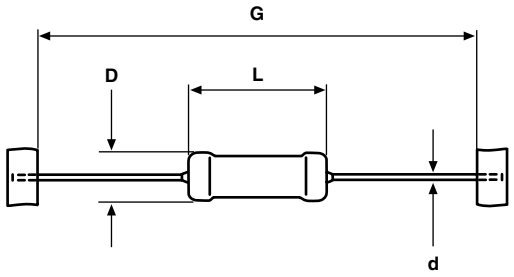
Notes

(2) Resistance value to be selected for ± 10 % tolerance from E12 and for ± 5 % from E24
(3) Special winding on request
(4) Other dimensions and variants on request
(5) See “Part Number and Product Description”
(6) See “Packaging Table”

** Please see document “Vishay Green and Halogen-Free Definitions (5-2008)”: www.vishay.com/doc?99902

PACKAGING TABLE									
MODEL	AMMO			LOOSE			BLISTER		
	PIECES	PACK. CODE	PACK. DESC.	PIECES	PACK. CODE	PACK. DESC.	PIECES	PACK. CODE	PACK. DESC.
AC01	1000	A1	A1						
AC01 DK/EK				500	LC	LC			
AC01RT	2500	AE	AE						
AC03	500	AC	AC						
AC03 DK/EK				500	LC	LC			
AC03 WSZ							1250	BM	BM
AC04	500	AC	AC						
AC04 DK/EK				500	LC	LC			
AC05	500	AC	AC						
AC05 DK/EK				500	LC	LC			
AC07	500	AC	AC						
AC07 DK/EK				250	LB	LB			
AC10	250	AB	AB						

DIMENSIONS

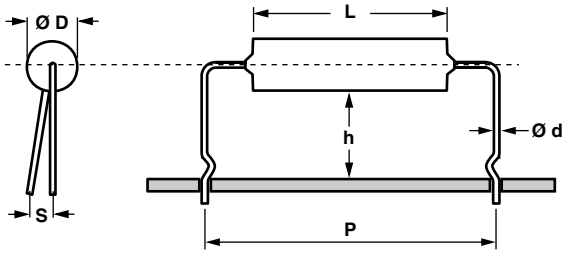


For packaging dimensions see: www.vishay.com/doc?28721

DIMENSIONS - Resistor types, mass and relevant physical dimensions					
MODEL	DIMENSIONS in millimeters [inches]				
	$D_{max.}$	$L_{max.}$	d	G	WEIGHT g PER UNIT
AC01	4.3 [0.169]	11 [0.433]	0.8 ± 0.03 [0.031 ± 0.001]	63 ± 1 [2.480 ± 0.039]	0.52
AC03	4.8 [0.189]	13 [0.512]		63 ± 1 [2.480 ± 0.039]	0.75
AC04	5.5 [0.217]	16.5 [0.650]		63 ± 1 [2.480 ± 0.039]	1.10
AC05	7.5 [0.295]	18 [0.709]		63 ± 1 [2.480 ± 0.039]	1.90
AC07	7.5 [0.295]	26 [1.024]		73 ± 1 [2.874 ± 0.039]	2.60
AC10	8.0 [0.315]	44 [1.732]		88 ± 1 [3.465 ± 0.039]	4.50

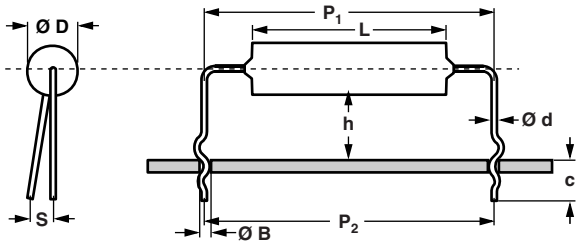
BENDING FORMS

KINK TYPE S = EK



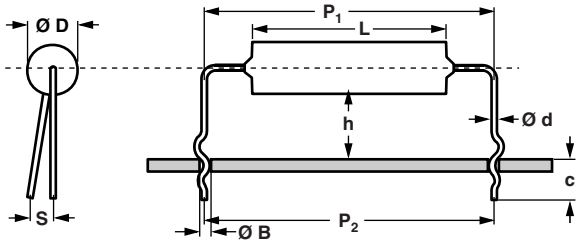
TYPE	Ø d	Ø $D_{max.}$	L	h ± 1	P ± 1	$S_{max.}$
AC01	0.8	(1)	(1)	8	17.8	2
AC03 - AC05					25.4	
AC07					33.0	

DOUBLE KINK SP = DK SP



TYPE	Ø d	Ø $D_{max.}$	L	h ± 1	P_1 ± 1	P_2 ± 3	$S_{max.}$	Ø B	c
AC01	0.8	(1)	(1)	8	19.8	17.8	2	1.0 ± 0.1	4.5 ± 1
AC03 - AC05					22.0	20.0			
					27.4	25.4			
AC07					35.0	33.0			

DOUBLE KINK LP = DK LP



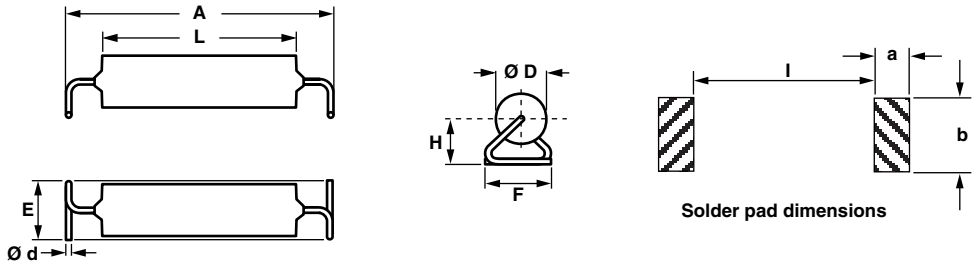
TYPE	Ø d	Ø $D_{max.}$	L	h ± 1	P_1 ± 1	P_2 ± 3	$S_{max.}$	Ø B	c
AC01 - AC03	0.8	(1)	(1)	8	17.8	17.8	2	1.0 ± 0.1	4.5 ± 1
AC03 - AC05					25.4	25.4			
AC07					33.0	33.0			

Note:

(1) See table DIMENSIONS

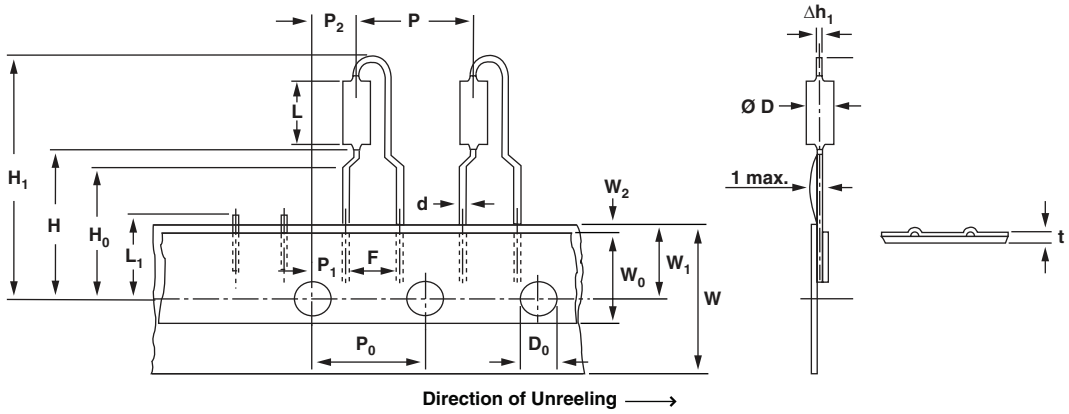
BENDING FORMS

WSZ



TYPE	Ø d	Ø $D_{max.}$	A	L	F	H	E	a	b	l
AC03 WSZ	0.8	(1)	17 ± 0.5	11 - 12	4.8 ± 0.5	3.6 ± 0.5	5.0 ± 0.5	2.5	5.5	14.5

RADIAL TAPED = RT



TYPE AC01		
Lead Ø	Ø d	0.8
Diameter	Ø D	(1)
Length	L	(1)
Pitch of components	P	12.7 ± 1.0
Pitch of spocket holes (2)	P_0	12.7 ± 0.3
Distance between hole center and resistor center	P_1	3.85 ± 0.7
Distance between hole center and lead center	P_2	6.35 ± 1.0
Lead spacing	F	5.0 + 0.6, - 0.1
Angle of insertion	Δh_1	2 max.
Width of carrier tape	W	18.0 ± 0.5
Width of adhesive tape	W_0	12.0 ± 0.5
Position of holes	W_1	9.0 ± 0.5
Position of adhesive tape	W_2	0.5 max.
Body to hole center	H	19.5 ± 1.0
Lead crimp to hole center (3)	H_0	16.0 ± 0.5
Hole Ø	D_0	4.0 ± 0.2
Thickness of tape (4)	t	0.9 max.
Height for cutting	L_1	11 max.
Height for insertion	H_1	32 max.

Notes

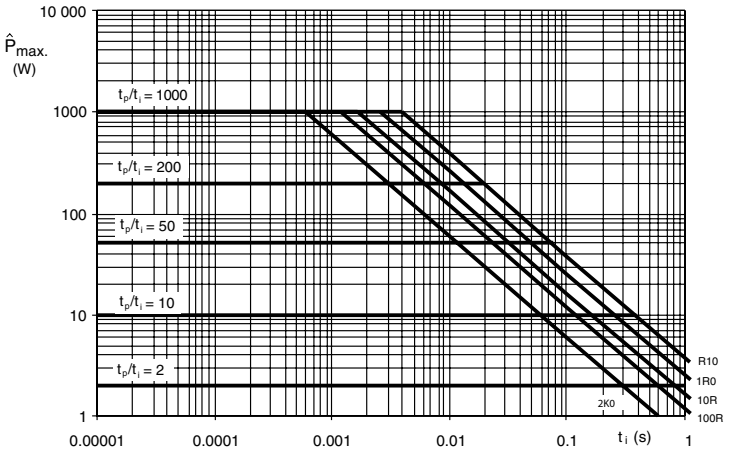
(1) See table DIMENSIONS

(2) Test over 10 holes - 9 intervals P_0 12.7 x 9 = 114.3 ± 0.5

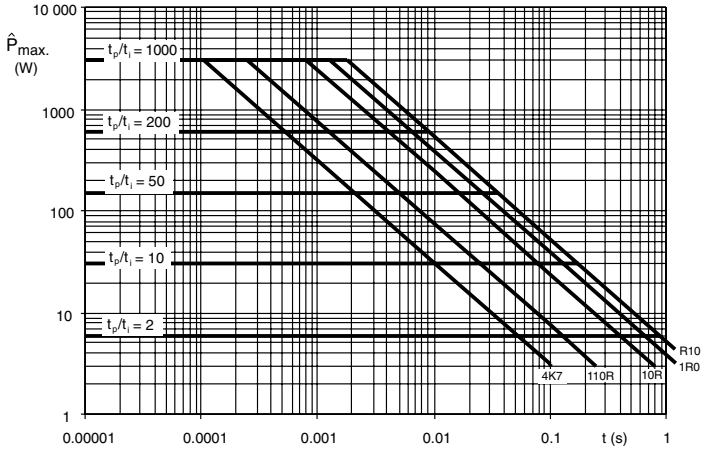
(3) Parallelism, < 0.5 mm

(4) Thickness of carrier tape: 0.55 mm ± 0.1

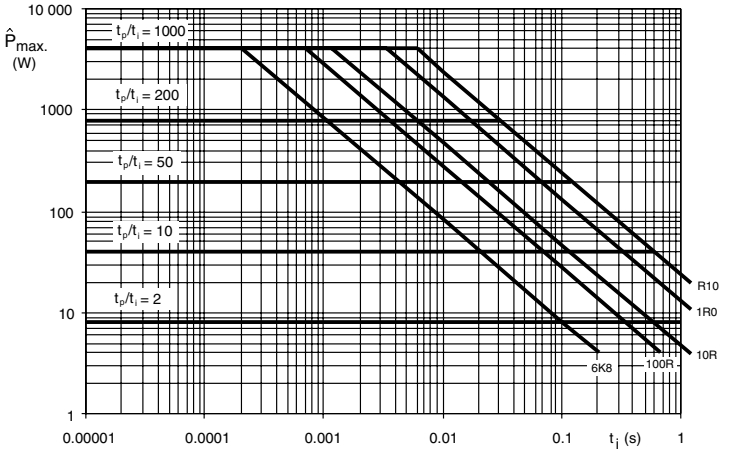
PULSE DIAGRAMS



AC01 Pulse on a regular basis; maximum permissible peak pulse power ($P_{max.}$) as a function of pulse duration (t_i)

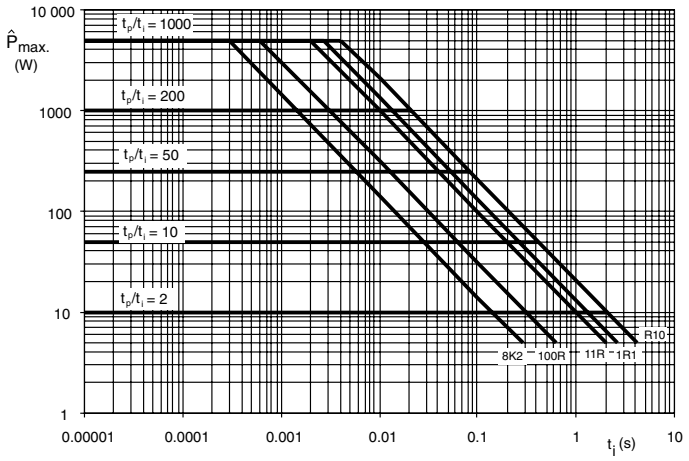


AC03 Pulse on a regular basis; maximum permissible peak pulse power ($P_{max.}$) as a function of pulse duration (t_i)

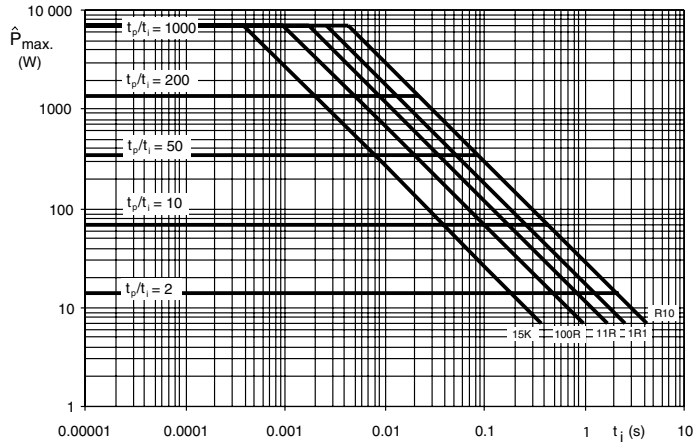


AC04 Pulse on a regular basis; maximum permissible peak pulse power ($P_{max.}$) as a function of pulse duration (t_i)

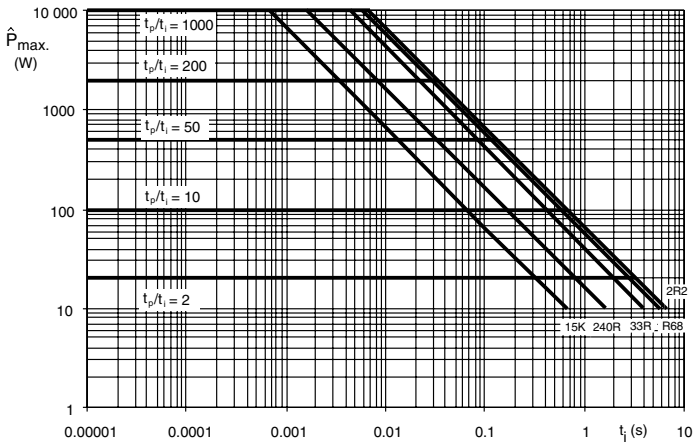
PULSE DIAGRAMS



AC05 Pulse on a regular basis; maximum permissible peak pulse power ($P_{max.}$) as a function of pulse duration (t_i)

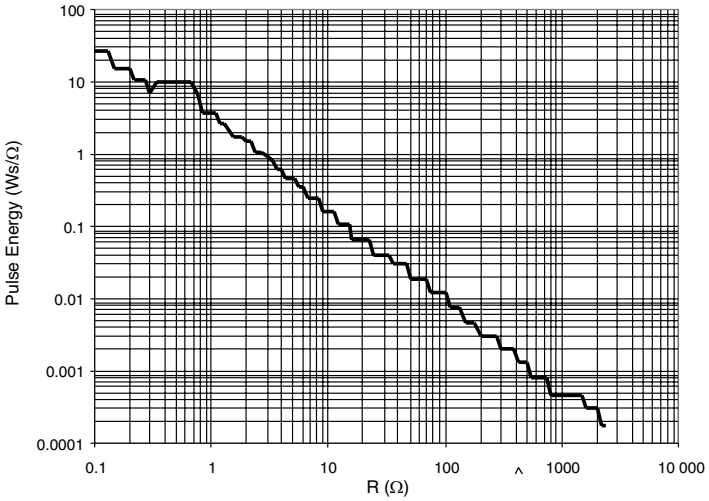


AC07 Pulse on a regular basis; maximum permissible peak pulse power ($P_{max.}$) as a function of pulse duration (t_i)

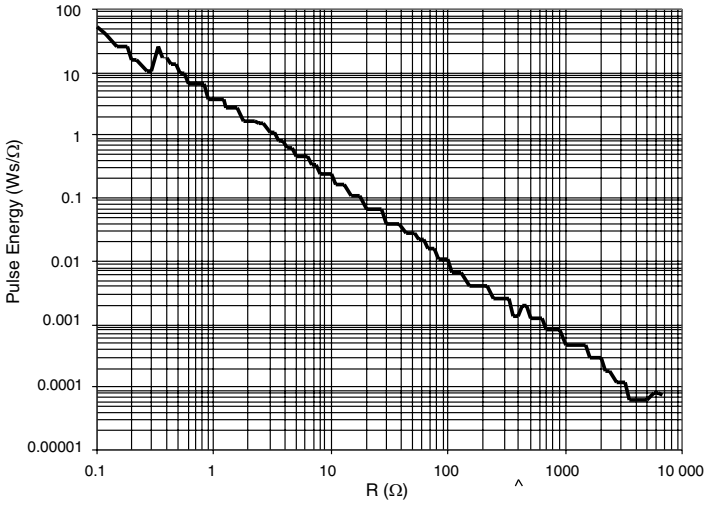


AC10 Pulse on a regular basis; maximum permissible peak pulse power ($P_{max.}$) as a function of pulse duration (t_i)

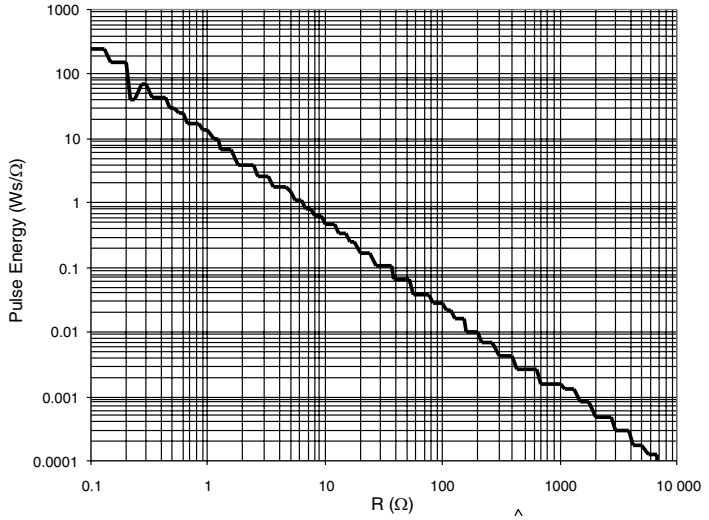
PULSE DIAGRAMS



AC01 Pulse capability; E (Ws) as a function of R (Ω)

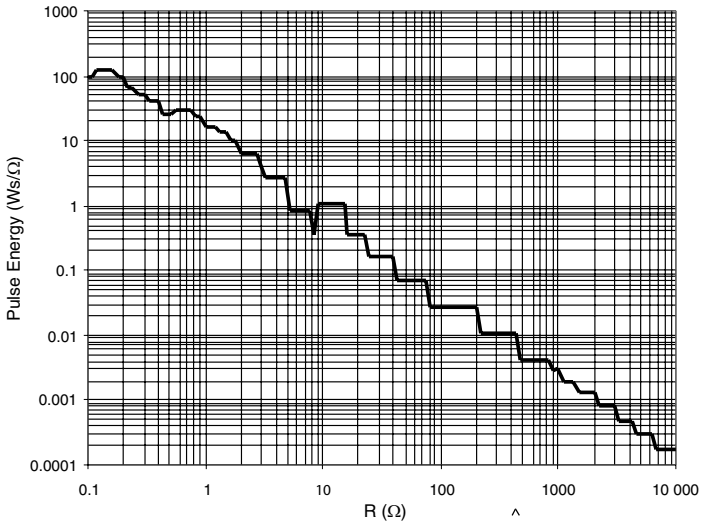


AC03 Pulse capability; E (Ws) as a function of R (Ω)

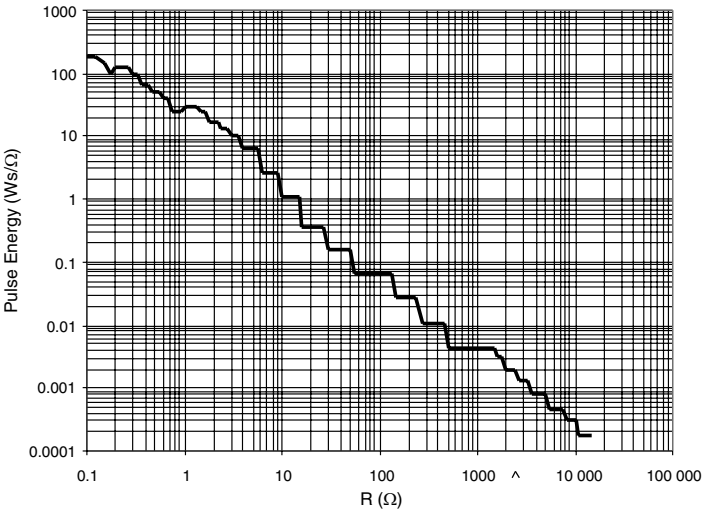


AC04 Pulse capability; E (Ws) as a function of R (Ω)

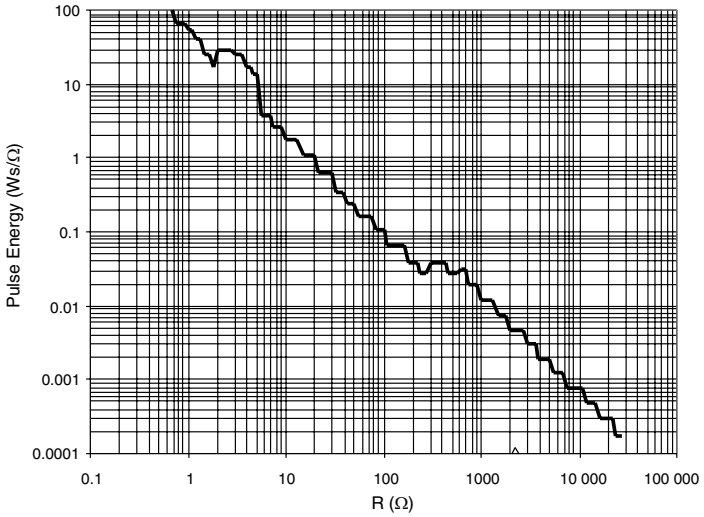
PULSE DIAGRAMS



AC05 Pulse capability; E (Ws) as a function of R (Ω)

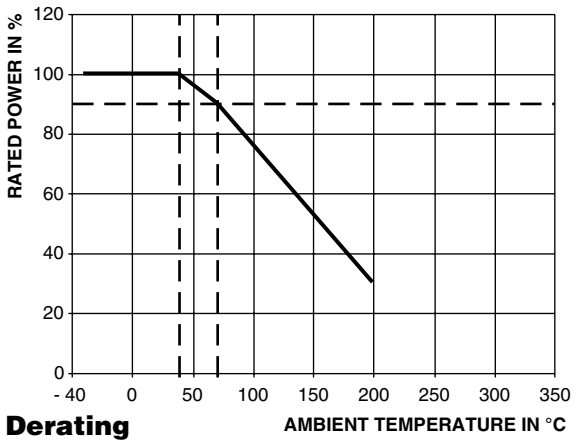


AC07 Pulse capability; E (Ws) as a function of R (Ω)

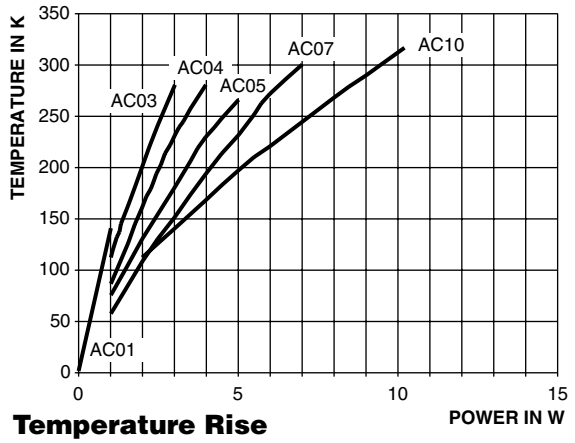


AC10 Pulse capability; E (Ws) as a function of R (Ω)

FUNCTIONAL PERFORMANCE



Derating



Temperature Rise

PERFORMANCE	
TEST	**TEST RESULTS**
Climatic Category	40/200/56
Damp Heat, Steady State, IEC 60115-1, 4.24 (40 ± 2) °C, 56 days, (93 ± 3) % RH	ΔR = ± (5 % R + 0.1 Ω)
Storage, UCT, IEC 60115-1, 4.25.3 1000 h, 200 °C, no load	ΔR = ± (5 % R + 0.1 Ω)
Climatic Sequence IEC 60115-1, 4.23	ΔR = ± (1 % R + 0.05 Ω)
Load Life, P_{70}: IEC 60115-1, 4.25.1 1000 h	ΔR = ± (5 % R + 0.1 Ω)
Resistance to Soldering Heat, IEC 60115-1, 4.18 (260 ± 5) °C, (10 ± 1) s	ΔR = ± (0.5 % R + 0.05 Ω)
Robustness of Termination, IEC 60115-1, 4.16 10N	ΔR = ± (0.5 % R + 0.05 Ω)
Short Time Overload 10 x Rated Power for 5 s	ΔR = ± (2 % R + 0.1 Ω)

12NC INFORMATION FOR HISTORICAL CODING REFERENCE

- The resistors have a 12-digit ordering code starting with 23.
- The subsequent 7 digits indicate the resistor type, specification and packaging.
- The remaining 3 digits indicate the resistance value:
  - The first 2 digits indicate the resistance value.
  - The last digit indicates the resistance decade in accordance with resistance decade table.

Last Digit of 12NC Indicating Resistance Decade

RESISTANCE DECADE	LAST DIGIT
0.1 Ω to 0.91 Ω	7
1 Ω to 9.1 Ω	8
10 Ω to 91 Ω	9
100 Ω to 910 Ω	1
1 kΩ to 9.1 kΩ	2
10 kΩ to 56 kΩ	3

12NC Example

The 12NC code of an AC01 resistor, value 47 Ω supplied in ammopack of 1000 units is: 2306 328 33479.

12NC - Resistor type and packaging

TYPE	23..			
	BANDOLIER IN AMMOPACK			
	RADIAL	STRAIGHT LEADS		
	2500 units	250 units	500 units	1000 units
AC01	06 328 90... (2) (3)	-	-	06 328 33...
AC03 (1)	-	-	22 329 03...	-
AC04 (1)	-	-	22 329 04...	-
AC05 (1)	-	-	22 329 05...	-
AC07 (1)	-	-	22 329 07...	-
AC10	-	-	-	-

Notes

(1) Products with bent leads and bulk packaging (100 pieces) are available on request

(2) Last 3 digits available on request

(3) Radial parts with tin plated copper leads

Disclaimer

All product specifications and data are subject to change without notice.

Vishay Intertechnology, Inc., its affiliates, agents, and employees, and all persons acting on its or their behalf (collectively, “Vishay”), disclaim any and all liability for any errors, inaccuracies or incompleteness contained herein or in any other disclosure relating to any product.

Vishay disclaims any and all liability arising out of the use or application of any product described herein or of any information provided herein to the maximum extent permitted by law. The product specifications do not expand or otherwise modify Vishay’s terms and conditions of purchase, including but not limited to the warranty expressed therein, which apply to these products.

No license, express or implied, by estoppel or otherwise, to any intellectual property rights is granted by this document or by any conduct of Vishay.

The products shown herein are not designed for use in medical, life-saving, or life-sustaining applications unless otherwise expressly indicated. Customers using or selling Vishay products not expressly indicated for use in such applications do so entirely at their own risk and agree to fully indemnify Vishay for any damages arising or resulting from such use or sale. Please contact authorized Vishay personnel to obtain written terms and conditions regarding products designed for such applications.

Product names and markings noted herein may be trademarks of their respective owners.